*Kidney International, Vol. 68 (2005), pp. 760–765*

# Sexual dysfunction in female hemodialysis patients: A multicenter study

**YU-SEN PENG, CHIH-KANG CHIANG, TZE-WAH KAO, KUNG-YU HUNG, CHIA-SHENG LU, SHOU-SHANG CHIANG, CHWEI-SHIUN YANG, YU-CHIN HUANG, KWAN-DUN WU, MING-SHIOU WU, YIH-RON LIEN, CHIN-CHING YANG, DONG-MING TSAI, PEI-YUAN CHEN, CHENG-SHIUNG LIAO, TUN-JUN TSAI, and WANG-YU CHEN**

*Department of Internal Medicine, Far Eastern Memorial Hospital, Taipei, Taiwan; National Taiwan University Hospital, Taipei, Taiwan; En Chu Kong Hospital, Taipei, Taiwan; Shin-Kong Wu Ho-Su Memorial Hospital, Taipei, Taiwan; Cathay General Hospital, Taipei, Taiwan; Department of Obstetrics and Gynecology, National Taiwan University Hospital, Taipei, Taiwan; Ho-Ping Municipal Hospital, Taipei, Taiwan; Taipei County San-Chung Hospital, Taipei, Taiwan; Taipei Municipal Jen-Ai Hospital, Taipei, Taiwan; Taipei Medical College University Hospital, Taipei, Taiwan; and Jen Chi Hospital, Taipei, Taiwan, R.O.C.*

**Sexual dysfunction in female hemodialysis patients: A multicenter study.**

*Background.* Sexual function is one aspect of physical functioning. Sexual dysfunction, no matter the etiology, could cause distress. In female hemodialysis patients, sexual problems have often been neglected in clinical performance and research.

*Methods.* We conducted this study by use of self-reported questionnaires. A total of 578 female hemodialysis patients in northern Taiwan were included in this study. Demographic data, comorbid diseases, medications in use, biochemical, and hematologic parameters were analyzed. All patients were asked to complete by themselves three questionnaires: (*1*) the Index of Female Sexual Function (IFSF) to assess sexual function; (*2*) the Beck Depression Inventory (BDI) (Chinese version) to rate the severity of depressive symptoms; and (*3*) the 36-item Short Form Health Survey Questionnaire (SF-36, Taiwan Standard Version 1.0) to survey their quality of life.

*Results.* A total of 138 female patients were enrolled into further analysis. The mean age was 48.7 ± 11.2 years old. The mean IFSF score was 24.5 ± 9.3. Age, BDI score, and serum triglyceride levels were the independent factors of dysfunction in each sexual functional dimension. Patients with higher IFSF scores had significantly higher scores in physical functioning and mental health ($P = 0.007$ and 0.018, respectively). Patients with higher intercourse satisfaction had significantly higher general health scores ($P = 0.001$).

*Conclusion.* Sexual dysfunction is frequent in the female hemodialysis population. It is strongly associated with increasing age, dyslipidemia, and depression. The subjects with sexual dysfunction had poorer quality of life. The diagnosis and treatment of sexual dysfunction should be included in the clinical assessment.

**Key words:** Index of Female Sexual Function (IFSF), Beck Depression Inventory (BDI), 36-item Short Form Health Survey Questionnaire (SF-36), hemodialysis.

Received for publication July 31, 2004
and in revised form January 7, 2005
Accepted for publication March 8, 2005



With advances in medical care, the survival of hemodialysis patients has been prolonged [1]. The aim of medical care has evolved beyond the support of life only. Enhancing patients' physical functioning and quality of life has become more and more important. Sexual function is one aspect of physical functioning. Sexual dysfunction, usually multifactorial in etiology, is highly prevalent in hemodialysis patients [2]. Sexual dysfunction can cause marked distress and interpersonal difficulties [3]. Diagnosis and treatment of sexual dysfunction should be included in the global health assessment of hemodialysis patients.

Previous research of sexual dysfunction in hemodialysis patients is almost entirely focused on erectile dysfunction of men. Research on the sexual problems encountered by women is primarily concerning hormonal imbalances, ovulation, or pregnancy [2]. Studies addressing decreased libido and sexual function are lacking [4]. A major obstacle in the design of such clinical studies is the need for reliable measurement techniques. Of the measures currently available, self-reported event logs or questionnaires are best suited for research or clinical assessment of female sexual function [5]. By use of self-reported questionnaires, we conducted a study to identify the prevalence and possible factors of sexual dysfunction in female hemodialysis patients.

## METHODS

### Subjects

A total of 578 female patients with end-stage renal disease (ESRD) receiving hemodialysis at 14 hospitals or dialysis centers in northern Taiwan were included in this study. All patients had received hemodialysis for more than 3 months before this study. They had no evidence

of active psychiatric disease, infection, uncontrolled congestive heart failure (more severe than New York Heart Association functional class II), or acute complications from uremia at the time of study. Those who refused to join the study were excluded. Other exclusion criteria included cognitive impairment, history of alcohol or substance abuse, unstable monogamous relationships with multiple male partners, and poorly controlled diabetes mellitus.

Biochemical and hematologic parameters were obtained by midweek predialysis blood samples within 1 month of this study. Other clinical variables, including marital status, duration on hemodialysis, primary renal disease, comorbid diseases, and medications in use, were also documented.

### Questionnaires

After written informed consent was obtained, each patient was asked to complete three questionnaires on her own: (*1*) the Index of Female Sexual Function (IFSF) to assess sexual function; (*2*) the Beck Depression Inventory (BDI) (Chinese Version) to rate the severity of depressive symptoms; and (*3*) the 36-item Short Form Health Survey Questionnaire (SF-36, Taiwan Standard Version 1.0) to survey quality of life.

The self-administered questionnaire, IFSF, has been used to assess sexual function in the normal population [6]. Linguistic validation of this questionnaire was conducted in Chinese. This process included two-way translations of the questionnaire items and comprehensive testing of the final item pool. The specific dimensions and questions analyzed in the IFSF included quality of sexual intercourse (questions 1 and 2; possible total score, 0 to 10), desire (questions 4 and 5; possible total score, 2 to 10), overall satisfaction with sexual function (questions 6 and 7; possible total score, 2 to 10), ability to achieve orgasm (question 8; possible total score, 1 to 5), the degree of lubrication (question 2; possible total score, 0 to 5), and the degree of clitoral sensation (question 9; possible total score, 1 to 5). The responses were graded on a scale of 1 (almost never or never) to 5 (almost always or always). A score of 0 indicated no attempt at intercourse. The highest possible total score was 45 (range 5 to 45), and the lower scores represented lower sexual function. For comparing with normal Chinese female population, 62 healthy peri- or postmenopausal female volunteers, aged from 40 to 60 years old, were recruited to participate in this sexual function survey.

The BDI is a standard self-administered questionnaire used to screen patients for depression [7] and had been used in the assessment of depression in ESRD patients [8, 9]. BDI scores of 14 to 19 represent a mild degree of depression, 20 to 28 a moderate degree, and 29 to 60 a severe degree of depression. The SF-36 is an instrument commonly utilized to measure quality of life in the general and uremic populations [10, 11]. It includes eight scales: physical functioning, role physical, bodily pain, general health, vitality, social functioning, role emotional, and mental health. Low scores in the eight domains indicate lower quality of life. These eight scales have been compressed into two primary summary scales: the physical component scale and the mental component scale. Because there were no standard steps of transformation and aggregation of scale scores in the Chinese population, we did not transform the SF-36 scores to the summary scales.

This study was approved by the Ethical Committee of Hospitals and monitored by the Institutional Review Board.

### Statistics

The patients' characteristics were presented as mean ± SD. The Kolmogorov-Smirnov test and Shapiro-Wilk test of normality were used for data distribution analysis. The nonparametric Mann-Whitney U test was used to test differences between patients and healthy volunteers. Spearman's rho correlation test was used in screening the independent variables of sexual function scores. If $P$ values were less than 0.10, the variables would be included in further regression analysis. Step-wise multiple linear regression analysis with both backward elimination and forward selection was employed to evaluate any association between sexual function scores as the outcome variable and multiple independent variables. A two-tailed $P$ value $<0.05$ was considered statistically significant. For studying the association between the scores of sexual function and quality of life, step-wise multivariable linear regression were used for analysis. All calculations were performed using a standard statistical package (SPSS 10.0 for Windows) (SSPS Inc., Chicago, IL, USA).

## RESULTS

One hundred and forty-three patients completed the IFSF questionnaires with a response rate of 24.7%. Among the nonresponders, 113 (19.6%) patients refused this survey, 291 (50.3%) patients did not complete this survey because of no more sexual activity, and 31 (5.3%) patients never had sexual experience before. That meant that at least 322 (55.7%) patients had no sexual life during our study period. Five responding patients were excluded because of incomplete survey results on quality of life. A total of 138 female patients were enrolled for further analysis. The mean age was 48.7 ± 11.2 (range 22 to 81) years old, much younger than non-responders (60.2 ± 13.2 years old) ($P < 0.001$). They had been receiving hemodialysis 53.3 ± 41.8 months before the study. Eighteen (13%) patients had diabetes mellitus and 28 (20.3%) patients had hypertension. No patient received

**Table 1.** Demographic and clinical characteristics of study patients

| | Number (%) | Mean ± SD |
|---|---|---|
| Patient demographics | | |
| Age *years* | | 48.7 ± 11.2 |
| Dialysis duration *months* | | 53.3 ± 41.8 |
| Married *number* (%) | 127 (92.0) | |
| Diabetes *number* (%) | 18 (13.0) | |
| Hypertension *number* (%) | 28 (20.3) | |
| Etiology of end-stage renal disease | | |
| Chronic glomerulonephritis (%) | 64 (46.4) | |
| Diabetic nephropathy (%) | 16 (11.6) | |
| Hypertensive nephropthy (%) | 10 (7.2) | |
| Lupus nephritis (%) | 8 (5.8) | |
| Polycystic kidney disease (%) | 5 (3.6) | |
| Undetermined (%) | 35 (25.4) | |
| Patients clinical characteristics | | |
| Albumin *g/dL* | | 4.1 ± 0.3 |
| Hematocrit % | | 29.0 ± 4.2 |
| Predialysis creatinine *mg/dL* | | 10.4 ± 1.6 |
| Predialysis blood urea nitrogen *mg/dL* | | 73.7 ± 16.9 |
| Serum uric acid *mg/dL* | | 7.4 ± 1.5 |
| Total serum calcium *mg/dL* | | 9.5 ± 0.9 |
| Serum phosphorus *mg/dL* | | 5.0 ± 1.3 |
| Serum iron μg*/dL* | | 75.1 ± 33.2 |
| Serum ferritin *ng/mL* | | 522.0 ± 439.0 |
| Single-pool Kt/V | | 1.49 ± 0.24 |
| Triglyceride *mg/dL* | | 177.8 ± 119.6 |
| Total cholesterol *mg/dL* | | 203.2 ± 43.5 |
| Intact parathyroid hormone *pg/mL* | | 201.64 ± 200.0 |

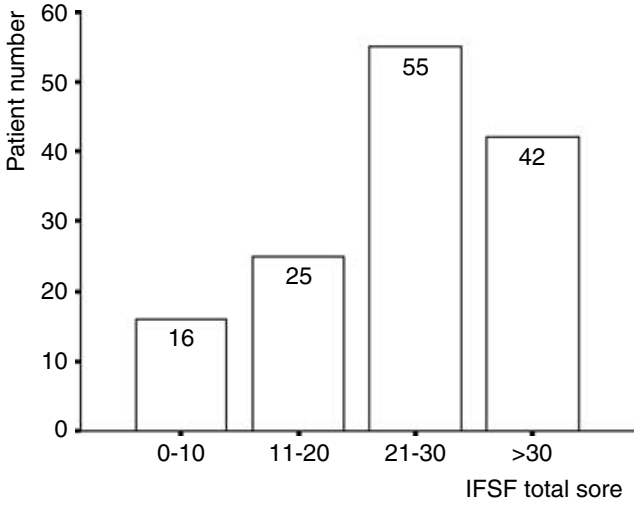


**Fig. 1. The distribution frequency of the total Index of Female Sexual Function (IFSF) score.** The mean IFSF score for all patients was 24.5 ± 9.3, and the median score was 27.

beta blocker treatment. Other clinical characteristics are listed in Table 1.

## Prevalence of sexual dysfunction

The mean IFSF score for all patients was 24.5 ± 9.3, and the median score was 27 (Fig. 1). Forty-one (29.7%) patients had scores at 20 or less, 55 (39.9%) between 21 and 30, and only 42 (30.4%) patients had scores greater than 30. The score distribution for individual dimensions

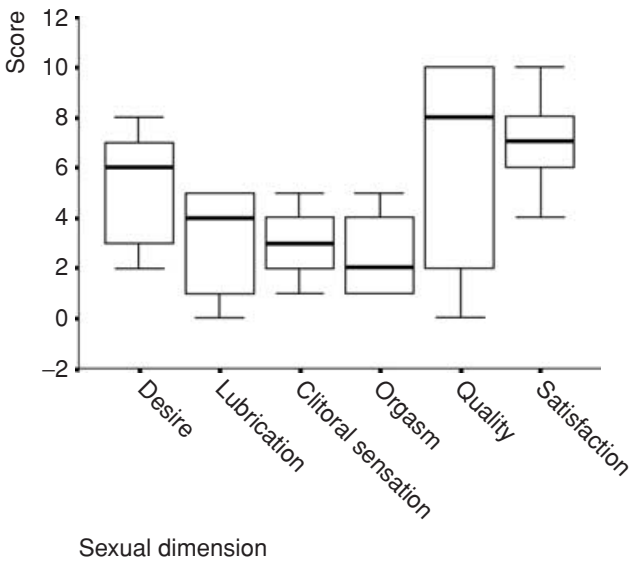


**Fig. 2. The distribution frequency of the six domains of sexual function.**

**Table 2.** The sexual function of patients and healthy volunteers

| | Patients ($N = 138$) | Healthy volunteers ($N = 62$) | $P$ value |
|---|---|---|---|
| Age | 48.7 ± 11.2 | 50.1 ± 6.0 | 0.334 |
| Quality of sexual intercourse | 8 (2, 10) | 8 (6, 10) | 0.057 |
| Sexual desire | 6 (3, 7) | 4 (4, 5) | 0.095 |
| Intercourse satisfaction | 7 (6, 8) | 8 (7, 8) | 0.003 |
| Degree of lubrication | 4 (1, 5) | 4 (3, 5) | 0.008 |
| Ability to achieve orgasm | 2 (1, 4) | 3 (2, 4) | <0.001 |
| Degree of clitoral sensation | 3 (2, 4) | 4 (3, 4) | <0.001 |
| Total score | 27 (15.5, 32) | 29 (25, 32) | 0.034 |

The scores were presented by median (25th, 75th percentile).

is summarized in Figure 2. The mean score of sexual desire was 4.8 ± 2.1, and the median score was 6. The mean score of lubrication was 2.9 ± 2.0, and the median score was 4. The score of clitoral sensation was 2.7 ± 1.1, and the median score was 3. The mean score of orgasms was 2.6 ± 1.4, and the median score was 2. The mean score of quality of sexual intercourse was 6.2 ± 3.8, and the median score was 8. The mean score of overall satisfaction with sexual function was 6.7 ± 1.9, and the median score was 7. The comparison between patients and healthy volunteers is summarized in Table 2. Except in the dimension of sexual desire, all the scores of other dimensions and total scores were lower in the patient group.

## The clinical parameters associated with sexual dysfunction

In bivariate analysis, advanced age was strongly associated with dysfunction in the total score and each dimension ($P < 0.001$). Diabetes was associated with dysfunction in the dimensions of desire, orgasms, and clitoral sensation ($P = 0.027$, $P = 0.005$, and $P = 0.002$,

**Table 3.** Multiple linear regression model of individual sexual function dimensions

| Variable | β Coefficient | *P* value |
|---|---|---|
| Quality of sexual intercourse | | |
| Triglyceride | −0.428 | <0.001 |
| Beck Depression Inventory score | −0.303 | 0.003 |
| Sexual desire | | |
| Beck Depression Inventory score | −0.341 | 0.001 |
| Triglyceride | −0.317 | 0.002 |
| Age | −0.211 | 0.047 |
| Intercourse satisfaction | | |
| Age | −0.341 | 0.003 |
| Degree of lubrication | | |
| Triglyceride | −0.374 | 0.001 |
| Beck Depression Inventory score | −0.327 | 0.002 |
| Ability to achieve orgasm | | |
| Beck Depression Inventory score | −0.345 | 0.001 |
| Triglyceride | −0.300 | 0.005 |
| Degree of clitoral sensation | | |
| Triglyceride | −0.363 | 0.001 |
| Age | −0.345 | 0.002 |
| Total serum calcium | 0.267 | 0.006 |
| Beck Depression Inventory score | −0.254 | 0.010 |
| Total score | | |
| Triglyceride | −0.370 | < 0.001 |
| Age | −0.286 | 0.005 |
| Beck Depression Inventory score | −0.306 | 0.002 |

**Table 4.** Association between female sexual function and quality of life

| Sexual function dimension | Quality of life dimension | β Coefficient | *P* value |
|---|---|---|---|
| Sexual desire | PF | 0.280 | 0.015 |
| | SF | 0.251 | 0.018 |
| Degree of lubrication | PF | 0.313 | 0.006 |
| | RP | 0.289 | 0.012 |
| Degree of clitoral sensation | — | — | — |
| Ability to achieve orgasm | MH | 0.328 | 0.004 |
| | PF | 0.304 | 0.007 |
| Quality of sexual intercourse | PF | 0.317 | 0.009 |
| Inter course satisfaction | GH | 0.355 | 0.001 |
| Total score | PF | 0.300 | 0.007 |
| | MH | 0.234 | 0.018 |

Adjusted by patients' age, time on dialysis, diabetes, cardiovascular disease, hematocrit levels, parathyroid hormone levels, predialytic blood urea nitrogen and serum creatinine, triglyceride, total cholesterol, marital status, and Beck Depression Inventory score. Abbreviations are: PF, physical functioning; SF, social functioning; RP, role physical, MH, mental health, GH, general health.

respectively). Hypertriglyceridemia was strongly associated with dysfunction in the dimensions of quality, desire, clitoral lubrication, orgasms, and clitoral sensation ($P = 0.001$, $P < 0.001$, $P$ 0.005, $P$ 0.013, and $P < 0.001$, respectively). Furthermore, hypertriglyceridemia was associated lower total IFSF scores ($P < 0.001$). The history of cardiovascular diseases was found to be associated with an increase in the dysfunction of the dimensions of satisfaction, orgasms, and clitoral sensation ($P = 0.010$, $P = 0.037$, and $P = 0.021$, respectively). The association of adequacy of dialysis and sexual function was also analyzed. However, by bivariate analysis, urea clearance (Kt/V) was not found to be associated with dysfunction in any sexual dimension. If dividing patients to two groups of inadequate dialysis (Kt/V < 1.2) ($N = 10$) and adequate dialysis (Kt/V >1.2) ($N = 128$), the scores of these two groups in each sexual dimension were similar ($P > 0.10$). The serum albumin and time on dialysis were not associated with sexual dysfunction, either. Higher hematocrit levels were only associated with a higher score of orgasms ($P = 0.005$). Higher depression scores on the BDI were significantly associated with lower scores in each dimension and the total score ($P < 0.001$).

By multiple linear regression analysis, age, higher BDI scores, and hypertriglyceridemia were found to be independent factors of dysfunction in each sexual functional dimension (Table 3). Although unadjusted analyses suggested that hematocrit levels, history of cardiovascular disease, and diabetes were significantly associated with sexual dysfunction, none were associated with sexual dysfunction after adjustment for age, psychologic depression scores, and serum triglyceride levels.

### Association of sexual dysfunction and decreased quality of life

Multiple linear regression analysis was used to examine the associations between various measures of quality of life, sexual dysfunction, psychologic depression, and other clinical variables (Table 4). After this adjustment, we found that patients with higher total scores had significantly higher scores in the dimensions of mental health and physical functioning. Higher sexual desire scores predicted higher scores in physical and social functioning ($P = 0.015$ and $P = 0.018$, respectively). The higher scores in the dimension of degree of lubrication were associated with higher scores in the dimensions of physical functioning and role limitation ($P = 0.006$ and $P = 0.012$, respectively). Patients with higher intercourse satisfaction had significantly higher general health scores ($P = 0.001$).

## DISCUSSION

Sexual evaluation must include a comprehensive patient history, physical examination, and psychologic evaluation. Physiologic evaluation of sexual response (vaginal photoplethysmography or duplex ultrasonography) has been used in some instances but is not uniformly available. Some authors have advocated the use of biochemical and hormonal evaluation, but such reports have not been able to relate these measures to sexual dysfunction [12]. Multidimensional self-report questionnaires are still the most widely used instruments in evaluating female sexual dysfunction. In this survey, we have produced five major findings.

First, in our patients, the mean IFSF score was only 24.5 ± 9.3 (median 27), comparable to the score of "postmenopausal women with sexual dysfunction" in the study of Kaplan et al [6]. This score was probably lower than that of a report of diabetic women (29.3 ± 6.4) [13]. In contrast to the peri- or postmenopausal Chinese women, our patients had still lower scores in most sexual dimensions. These observations imply that the prevalence of sexual dysfunction in our hemodialysis subjects is high. Although the total scores were low, the scores of intercourse satisfaction in our patient group were higher than those in previous studies [6, 13]. Such a discrepancy may be due to the higher degree of conservatism in sexual attitudes of Chinese people.

Second, regardless of the total score or scores for individual dimensions, increasing age and hypertriglyceridemia were the major physical factors associated with sexual dysfunction. The association of increasing age and sexual dysfunction has been previously demonstrated in nonuremic subjects [14]. In elderly subjects, vascular insufficiency, comorbid diseases, decreased organ function, and self-body image change have been claimed as the leading factors in sexual dysfunction. The vasculogenic factor of female sexual dysfunction should receive more attention. A recently named clitoral and vaginal vascular insufficiency syndrome was introduced by Goldstein and Berman [15]. This disorder is directly related to diminished genital blood flow secondary to atherosclerosis of iliohypogastric/pudendal arterial bed. Diminished pelvic blood flow leads to vaginal wall and clitoral smooth muscle fibrosis [16], which may impair with normal relaxation and dilation responses to sexual stimulation and result in symptoms of vaginal dryness and dyspareunia. Uremic patients with increased serum triglycerides have usually had more advanced atherosclerosis [17]. This implicates vascular insufficiency as the major cause of sexual dysfunction in our hypertriglycemic patients.

Third, our results did not disclose the adequacy of dialysis to be associated with sexual dysfunction. In our study, the Kt/V was less than 1.2 in only ten patients and serum albumin was less than 3.5 mg/dL in only five patients. The numbers of inadequate dialysis patients was so limited, so we could not explore the exact sexual disorders in them. According to these results, we can conclude only that higher Kt/V than 1.2 does not prevent sexual dysfunction in female hemodialysis patients.

Fourth, our study demonstrated that the degree of sexual dysfunction in female hemodialysis patients could be directly correlated with the degree of depressive symptoms. Previous studies have also demonstrated that emotional issues significantly affect sexual behaviors in normal populations [18]. Depressive disorder is a common psychologic disturbance and is associated with increased mortality in dialysis patients [8]. Our results suggest that, in evaluating sexual dysfunction of hemodialysis patients, exploration and management of depressive disorders are absolutely necessary.

Fifth, we demonstrated that, in female hemodialysis patients, sexual dysfunction is associated with lower physical functioning and mental health. Those patients with higher sexual desire had better social functioning. The sexual dysfunction and quality of life often interfered with each other. Any physical or psychologic disorders that could affect one's quality of life also affected sexual desire and function. On the other hand, because the inability to have normal sexual life can erode an individual's sense of self-esteem and lead to emotional and marital tension, quality of life is diminished in patients [19]. Such findings are comparable with that of male hemodialysis patients [20].

As the first large-scale study to analyze sexual dysfunction in female hemodialysis patients, there are, inevitably, some limitations of the study. First, the response rate in our survey was low (24.7%). Sex research is generally characterized by a bias due to volunteer participation [21]. The women who refused participation had a higher degree of conservatism in sexual attitudes. There were 322 (55.7%) patients who had no sexual life during our study. Because of sexual life is greatly influenced by physical capacity, psychologic disorders, widowhood, and even the interrelationship between couples. It is difficult to clarify the exact cause. It is impossible to know how much difference existed between responders and nonresponders. Second, the number of controlled healthy volunteers in our study is limited. It has been demonstrated that women of different racial groups have different patterns of sexual dysfunction [22]. Unfortunately, we are not aware of any study on a large scale regarding Chinese female sexual function. Third, only 18 (13.0%) of diabetic patients were included in our study, and the result revealed that diabetes alone was not an independent factor in each sexual dimension. The study of sexual dysfunction in diabetic women is scarce. Further research about the impact of diabetes on female sexual dysfunction is necessary. Fourth, we disclosed the association of serum triglyceride levels and sexual dysfunction. Further physiologic evaluations, such as vaginal photoplethysmography or duplex ultrasonography, are sill needed to support such a conclusion.

## CONCLUSION

Sexual dysfunction is highly prevalent in the female hemodialysis population. It is strongly associated with increasing age, dyslipidemia, and depression. Subjects with sexual dysfunction have poorer quality of life. The diagnosis and treatment of sexual dysfunction should be included in clinical assessment. Future research should include evaluation of the effectiveness of treatment of sexual dysfunction and assessment of changes in quality of life after therapy.

## ACKNOWLEDGMENT

The authors would likely to thank the Ta-Tung Kidney Foundation and the Mrs. Hsiu-Chin Lee Kidney Research Fund for grant support of this study.

*Reprint requests to Tun-Jun Tsai, Division of Nephrology, Department of Internal Medicine, National Taiwan University Hospital, No. 7, Chung-Shan South Road, Taipei 10016, Taiwan, R.O.C.*
*E-mail: paul@ha.mc.ntu.edu.tw*

## REFERENCES

1. Anonymous: Patient mortality and survival in ESRD. *Am J Kidney Dis* 34:S74–S86, 1999
2. Palmer BF: Sexual dysfunction in uremia. *J Am Soc Nephrol* 10:1381–1388, 1999
3. Shabsigh R, Klein LT, Seidman S, *et al*: Increased incidence of depressive symptoms in men with erectile dysfunction. *Urology* 52:848–852, 1998
4. Rosen RC: Female sexual dysfunction: Industry creation or underrecognized problem? *BJU Int* 92:3–4, 2003
5. Rosen RC: Assessment of female sexual dysfunction: Review of validated methods. *Fertil Steril* 77:S89–S93, 2002
6. Kaplan SA, Reis RB, Kohn IJ, *et al*: Safety and efficacy of sildenafil in postmenopausal women with sexual dysfunction. *Urology* 53:481–486, 1999
7. Peterson RA, Kimmel PL, Sacks CR, *et al*: Depression, perception of illness and mortality in patients with end-stage renal disease. *Int J Psychiatry Med* 21:343–354, 1991
8. Kimmel PL, Peterson RA, Weihs KL, *et al*: Multiple measurements of depression predict mortality in a longitudinal study of chronic hemodialysis outpatients. *Kidney Int* 57:2093–2098, 2000
9. Wuerth D, Finkelstein SH, Ciarcia J, *et al*: Identification and treatment of depression in a cohort of patients maintained on chronic peritoneal dialysis. *Am J Kidney Dis* 37:1011–1017, 2001
10. Lowrie EG, Curtin RB, LePain N, *et al*: Medical outcomes study short form-36: A consistent and powerful predictor of morbidity and mortality in dialysis patients. *Am J Kidney Dis* 41:1286–1292, 2003
11. Chen YC, Hung KY, Kao TW, *et al*: Relationship between dialysis adequacy and quality of life in long-term peritoneal dialysis patients. *Perit Dial Int* 20:534–540, 2000
12. Toorians AWFT, Janssen E, Laan E, *et al*: Chronic renal failure and sexual functioning: Clinical status versus objectively assessed sexual response. *Nephrol Dial Transplant* 12:2654–2663, 1997
13. Erol B, Tefekli A, Ozbey I, *et al*: Sexual dysfunction in type II diabetic females: A comparative study. *J Sex Marital Ther* 28:55–62, 2002
14. Berman JR, Berman LA, Werbin TJ, *et al*: Clinical evaluation of female sexual function: Effects of age and estrogen status on subjective and physiologic sexual responses. *Int J Impot Res* 11:S31–S38, 1999
15. Goldstein I, Berman JR: Vasculogenic female sexual dysfunction: Vaginal engorgement and clitoral erectile insufficiency syndrome. *Int J Impot Res* 10:S84–S90, 1998
16. Tarcan T, Park K, Goldstein I, *et al*: Histomorphometric analysis of age-related structural changes in human clitoral cavernosal tissue. *J Urol* 161:940–944, 1999
17. Shoji T, Ishimura E, Inaba M, *et al*: Atherogenic lipoproteins in end-stage renal disease. *Am J Kidney Dis* 38:S30–S33, 2001
18. Berman JR, Bassuk J: Physiology and pathophysiology of female sexual function and dysfunction. *World J Urol* 20:111–118, 2002
19. Althof SE: Quality of life and erectile dysfunction. *Urology* 59:803–810, 2002
20. Rosas SE, Joffe M, Franklin E, *et al*: Association of decreased quality of life and erectile dysfunction in hemodialysis patients. *Kidney Int* 64:232–238, 2003
21. Wolchik SA, Braver SL, Jensen K: Volunteer bias in erotica research. Effects of intrusiveness of measure and sexual background. *Arch Sex Behav* 14:93–107, 1985
22. Laumann EO, Paik A, Rosen RC: Sexual dysfunction in the United States: prevalence and predictors. *JAMA* 281:537–544, 1999